

REMARKS

Status of Application

Claims 1-26 and 29-48 are pending in the application; the status of the claims is as follows:

Claims 6-26 and 30-43 are withdrawn from consideration.

Claims 1-5, 29, and 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,920,409 to Yamagishi ("Yamagishi") in view of U.S. Patent No. 6,954,195 B2 to Yoneda et al. ("Yoneda").

Claims 1-5, 29, and 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of U.S. Patent No. 6,697,039 B1 to Yamakawa et al. ("Yamakawa").

Claims 1-5, 29, and 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of U.S. Patent No. 6,414,669 B1 to Masazumi ("Masazumi") and U.S. Patent No. 5,602,559 A to Kimura ("Kimura").

Approval of Drawings

Applicants acknowledge that the Examiner has acknowledged receipt of the correcting drawings filed on August 16, 2001 as stated in the Office Action dated April 20, 2004. Applicants respectfully request the approval of the Request for Approval of Proposed Drawing Changes filed on August 16, 2001 in order for the corrected replacement drawings to be filed.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a), as being unpatentable over Yamagishi in view of Yoneda, is respectfully traversed based on the following.

For the Examiner's convenience, the relevant portions of claim 1 are provided below:

1. . . .
a liquid crystal layer comprising liquid crystal . . . the liquid crystal having a memory effect, the liquid crystal exhibiting a cholesteric phase;
a number of first scanning electrodes aligned in a first direction at a first pitch, . . .
a plurality of signal electrodes facing the first scanning electrodes with the liquid crystal layer sandwiched between the signal electrodes and the first scanning electrodes, the signal electrodes being aligned in the second direction at a second pitch wider than the first pitch

The Office Action asserts that "scanning" and "signal" electrodes are little more than labels, which can easily be interchanged. To this end, the Office Action renames the scanning and signal electrodes of Yamagishi to satisfy the pitch requirements of claim 1. However, as explained in the Preliminary Amendment dated January 24, 2005, in the Amendment dated November 2, 2005, and in the Pre-Appeal Brief Request for Review dated June 13, 2006, such renaming produces unacceptable visual effects. This is in contrast to the Office Action which asserts "The renamed electrodes will not change any property of [the] display."

One goal of the present invention is to minimize the "blackout" problem found in cholesteric-phase liquid crystal displays (LCDs). This blackout is seen as a set of horizontal black bars that scroll down the image due to the light absorbing layer on the back surface of the LCD. The black bars are oriented horizontally as they are due to the signals applied to the scanning electrodes that traditionally extend in the horizontal direction. That the scanning electrodes are traditionally horizontal is clearly illustrated by the fact that Yamagishi, Yoneda, Yamakawa, and Kimura each disclose horizontal, not vertical, scan lines. Thus, the

renaming of the electrodes will cause the blackout lines to scroll across the screen from left to right (or right to left); it would not solve the blackout problem. This change in scrolling direction is clearly a change in at least one property of the display, in spite of the assertion in the Office Action that “The renamed electrodes will not change any property of [the] display.”

Further, and perhaps of even greater importance, renaming the electrodes in Figure 1 of Yamagishi will produce a very elongated pixel, which has a drastic impact on the display properties. Figure 1 of Yamagishi shows a prior art three-color pixel that is 1.5 times longer in the Y-direction than in the X-direction. After “renaming” the electrodes, the three-color pixel would be 6 times longer in the X-direction than in the Y-direction. The resulting display would be counter to all efforts to improve displays by reducing the “dot-pitch,” whether it is a CRT, an LCD, or a plasma display. Such a long, narrow pixel would especially distort the color portion of the image so badly that the viewer would find the display to be unacceptable. If consumers would not buy an LCD because the image is distorted, as proposed by the Office Action, one of ordinary skill in the art would not take this approach. In other words, consumer response would teach one of ordinary skill in the art away from adopting the proposed renaming of the electrodes.

Figure 1 below illustrates the impact of renaming the electrodes on the pixels. Figure 1A illustrates a pixel corresponding to that disclosed as prior art by Yamagishi, i.e., it has a 1.5:1 aspect ratio. Figure 1B corresponds to a pixel resulting from renaming the electrodes, i.e., it has a 6:1 aspect ratio.



Fig. 1A



Fig. 1B

Figure 2 below illustrates the impact of renaming the electrodes on an image. The image is intended to be a red “A” across alternating green and blue stripes. The overall pattern is 12 X 15 pixels. Figure 2A corresponds to the pixels disclosed as prior art by Yamagishi, while the Figure 2B corresponds to the renamed electrodes. Note that the subpixels, corresponding to an individual color, are identical in size, the difference is entirely due to the different aspect ratios.

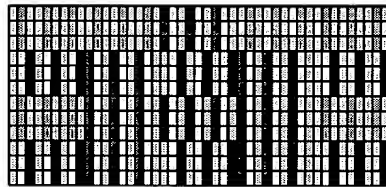


Fig. 2A

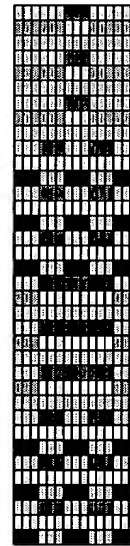


Fig. 2B

As is clearly evident, the statement, “The renamed electrodes will not change any property of [the] display,” cannot be correct. Because the simple act of merely renaming the electrodes has such a drastic impact on the properties of the display, Yamagishi does not suggest to one of ordinary skill in the art that the electrodes should be renamed. In fact, Yamagishi itself teaches away from the proposed renaming of the electrodes.

The elongated pixels illustrated in Yamagishi, and upon which the Office Action relies, is the prior art, see column 1, lines 15-17. These elongated pixels produce a number of problems that Yamagishi solves, in part, by using square pixels as illustrated in each of Figs. 3-8 and 10, corresponding to Yamagishi’s seven preferred embodiments. Thus,

Yamagishi itself clearly teaches away from the use of elongated pixels of any kind, let alone one with the specific orientation required by claim 1. Because Yamagishi, the primary reference upon which the Examiner relies, teaches away from elongated pixels, a problem that is exacerbated by the proposed renaming of the electrodes, it is difficult to understand the position taken in the Office Action. This is especially true in view of the faulty assertion that renaming the electrodes “will not change any property of display,” emphasis added.

On pages 5 and 6 of the Office Action, it appears the Examiner believes that renaming the electrodes will merely rotate the horizontal and vertical aspects of an image, i.e., rotate the image by 90°. It appears the Examiner completely overlooks the impact of the aspect ratio on this rotation. Figure 3 below illustrates this impact. Figure 3C corresponds to Figure 2A above in that it includes the original 1.5:1 aspect ratio disclosed as prior art by Yamagishi. Figure 3A corresponds to a red letter “A” across green and blue stripes, but employs the proposed electrode renaming, and thus the “A” appears rotated by 90°. Figure 3B corresponds to Figure 3A, but is rotated 90° so that the “A” appears upright. The images are again 12 X 15 pixels in size and each uses the same size subpixel, therefore any differences are strictly due to renaming the electrodes.



Fig. 3A



Fig. 3B

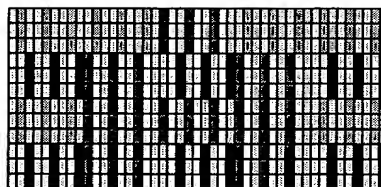


Fig. 3C

As can be clearly seen, renaming the electrodes does far more than merely rotating the image - a fact that can only be appreciated when one considers the impact renaming the electrodes has on the aspect ratio of the pixels.

Furthermore, as noted in the Office Action, Yamagishi fails to disclose a liquid crystal having a memory effect and exhibiting cholesteric phase. Because Yamagishi does not disclose a liquid crystal exhibiting a cholesteric phase, it cannot disclose the blackout problem inherent in such liquid crystals, the issue addressed by the present invention. The simple substitution of a liquid crystal exhibiting a cholesteric phase into Yamagishi's apparatus would result in a display having this blackout problem - a problem Yamagishi's apparatus did not previously have. While the Office Action claims substituting this type of liquid crystal would reduce the power consumed by Yamagishi's apparatus, it introduces the aforementioned blackout problem. Thus, the proposed combination exchanges one problem for another, a situation avoided by those of ordinary skill in the art.

For each of the above reasons, it would be obvious to one of ordinary skill in the art that simply renaming the electrodes would produce an undesirable result. Further, the proposed combination solves one problem at the expense of generating a new problem, thereby creating no net improvement. Thus, the Applicants assert that the Office Action fails to raise a *prima facie* case of obviousness for at least these two reasons. The Office Action fails to provide any motivation for renaming the electrodes, especially in view of the many reasons why one would not be motivated to do so. Secondly, one of ordinary skill in the art would not be motivated to combine Yoneda with Yamagishi as solving one problem generates another.

Claims 2-5, 29, and 44-46 depend, either directly or indirectly, from claim 1. As claim 1 is considered non-obvious over the combination of Yamagishi and Yoneda, claims 2-5, 29, and 44-46 are nonobvious for at least the same reasons. Claims 2-5, 29, and 44-46 provide additional limitations not disclosed or suggested by the combination of Yamagishi and Yoneda. Claim 2 provides that the shorter sides of the rectangular pixel are parallel to

the first direction while the longer sides are parallel to the second direction. This is exactly the opposite of what is disclosed by Yamagishi, and Yoneda discloses square pixels. It is only by renaming the electrodes that the pixels in Yamagishi appear to match that required by claim 2. However, as discussed above, this creates numerous problems and one of ordinary skill in the art would not rename the electrodes as even Yamagishi teaches away from renaming the electrodes. Thus, the combination of Yamagishi and Yoneda fails to disclose or suggest each limitation of claim 2. Claim 4 provides that the first pitch is $1/n$ of the second pitch wherein n is a natural number not less than two, while claim 5 requires n to equal 2. This is exactly the opposite of what is disclosed by Yamagishi, and Yoneda discloses square pixels. It is only by renaming the electrodes that the pixels in Yamagishi appear to match that required by claims 4 and 5. However, as discussed above, this creates numerous problems and one of ordinary skill in the art would not rename the electrodes. Thus, the combination of Yamagishi and Yoneda fails to disclose or suggest each limitation of claims 4 and 5.

It should be noted that the Office Action states claims 45 and 46 are rendered obvious by the combination of Yamagishi and Yoneda, see page 2. However, the Office Action fails to provide any indication as to where the limitations of claims 45 and 46 are specifically disclosed or suggested in either of Yamagishi or Yoneda. In fact, the Office Action fails to even mention the limitations of claims 45 and 46, i.e., the relative magnitudes of the selective signals from the scan and signal drivers (claim 45) and that the pulse form of the signals is a function of the image data (claim 46). Because the Office Action has utterly failed to provide any indication as to where Yamagishi or Yoneda disclose or suggest the limitations of claims 45 and 46, the Office Action has not raised a *prima facie* case of obviousness, and thus claims 45 and 46 are considered nonobvious over the cited combination of Yamagishi and Yoneda.

Claim 47 requires, in part, "said pixels aligned in a first direction along the columns at a first pitch and in a second direction along the rows at a second pitch wider than the first pitch." In connection with the remainder of claim 47, which specifies the orientation of the scan and signal electrodes, the resultant pixels correspond to those in claim 1 in terms of

aspect ratio and orientation. As discussed at length above, Yamagishi does not disclose this required aspect ratio and orientation – it discloses the opposite. For this reason the Office Action renames the electrodes, with all of the attendant shortcomings discussed above. Thus, claim 47 is considered nonobvious over the combination of Yamagishi and Yoneda for at least the same reasons as claim 1.

Claim 48 requires, in part, “a plurality of first scanning electrodes aligned in a first direction at a first pitch, . . . a plurality of signal electrodes . . . the signal electrodes being aligned in the second direction at a second pitch wider than the first pitch.” These electrodes thus define pixels corresponding to those in claim 1 in terms of aspect ratio and orientation. As discussed at length above, Yamagishi does not disclose this required aspect ratio and orientation – it discloses the opposite. For this reason the Office Action renames the electrodes, with all of the attendant shortcomings discussed above. Thus, claim 48 is considered nonobvious over the combination of Yamagishi and Yoneda for at least the same reasons as claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Yoneda, be reconsidered and withdrawn.

The rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a), as being unpatentable over Yamagishi in view of Yamakawa, is respectfully traversed based on the following.

Because the Office Action relies upon Yamagishi for its disclosure of rectangular pixels, virtually all of the above comments with respect to the combination of Yamagishi and Yoneda also apply to the combination of Yamagishi and Yamakawa. In particular, the Office Action again relies upon renaming the electrodes in the prior art disclosed by Yamagishi. As discussed in detail above, the Office Action is not correct when it states “The renamed electrodes will not change any property of [the] display.” This error is due, in large part, to neglecting the change in aspect ratio caused by renaming the electrodes. In sum, the

combination of Yamagishi and Yamakawa fails to disclose or suggest each limitation of claims 1-5, 29, and 44-48, and in fact the combination teaches away from the claimed apparatuses. Further, while the combination of Yamagishi and Yamakawa may result in reduced power consumption, it creates the problem of blackout, and thus one of ordinary skill in the art would not combine the two references. It should also be noted that the Office Action utterly fails to address the limitations of claims 45 and 46, just as it did for the combination of Yamagishi and Yoneda.

Accordingly, it is respectfully requested that the rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Yamakawa, be reconsidered and withdrawn.

The rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a), as being unpatentable over Yamagishi in view of Masazumi and Kimura, is respectfully traversed based on the following.

Because the Office Action again relies upon Yamagishi for its disclosure of rectangular pixels, virtually all of the above comments with respect to the combination of Yamagishi and Yoneda also apply to the combination of Yamagishi, Masazumi, and Kimura. In particular, the Office Action again relies upon renaming the electrodes in the prior art disclosed by Yamagishi. As discussed in detail above, the Office Action is not correct when it states "The renamed electrodes will not change any property of [the] display." This error is due, in large part, to neglecting the change in aspect ratio caused by renaming the electrodes. In sum, the combination of Yamagishi, Masazumi, and Kimura fails to disclose or suggest each limitation of claims 1-5, 29, and 44-48, and in fact the combination teaches away from the claimed apparatuses. Further, while the combination of Yamagishi, Masazumi, and Kimura may result in reduced power consumption, it creates the problem of blackout, and thus one of ordinary skill in the art would not combine the two references. It should also be noted that the Office Action again utterly fails to address the limitations of claims 45 and 46, just as it did for the combination of Yamagishi and Yoneda.

Application No. 09/891,997
Response to Non-Compliant Amendment dated February 13, 2007
Reply to Notice of Non-Compliant Amendment of January 18, 2007

Accordingly, it is respectfully requested that the rejection of claims 1-5, 29, and 44-48 under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Masazumi and Kimura, be reconsidered and withdrawn.

CONCLUSION

Wherefore, in view of the foregoing remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin LLP Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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